

Listing of Claims

This listing of claims will replace all prior versions of claims and listings of claims in the application:

1. (Currently Amended) A liquid distillation system comprising:

a) an input for receiving untreated input liquid;

a sump in communication with the input wherein the sump comprising at least one heating element and wherein input liquid is preheated;

b) an evaporative condenser coupled to the sump input for transforming the liquid to vapor and for transforming compressed vapor into a distilled liquid product, ~~wherein the evaporative condenser comprising a plurality of parallel core evaporator tubes, each tube having a first open end in communication with a the sump and a second open end in communication with a head chamber;~~

e) a head chamber for collecting vapor from the evaporative condenser; and

d) a vapor pump for compressing the vapor, the vapor pump in communication with the ~~evaporative condenser~~ head chamber and comprising:

i. a single continuous internal drive shaft; ~~and~~

ii. at least one intake for axial feeding; and

iii. an eccentric rotor with a fully rotatable housing, the rotatable housing supported by a rotatable housing shaft;

wherein the evaporative condenser comprising a plurality of parallel core evaporator tubes, each tube having a first open end in communication with the sump and a second open end in communication with the head chamber.

2. (Previously Presented) The liquid distillation system as in claim 1 wherein the rotor further comprises a multiplicity of vanes separated by chambers, each chamber having an exit.

3. (Original) A liquid distillation system according to claim 1 wherein the input is coupled to at least one heat source.

Claims 4-7 (Canceled)

8. (Previously Presented) A liquid distillation system according to claim 1 further comprising an output for collection of distilled liquid product.

Claims 9-11 (Canceled)

12. (Previously Presented) A liquid distillation system according to claim 1, the system further comprising a switch selected from the group consisting of a thermostatic switch, a pressure-sensing switch, a thermal transducer and a pressure transducer, for signaling completion of the heating phase and turning off the heating unit.

13. (Original) A liquid distillation system according to claim 1 further comprising a heat exchanger for receiving liquid from the input such that heat from at least one source is exchanged with the input liquid.

14. (Canceled)

15. (Original) A liquid distillation system according to claim 13 wherein the heat exchanger is a multi-line exchanger for exchanging heat from a number of sources with the input liquid.

Claims 16-17 (Canceled)

18. (Previously Presented) A liquid distillation system according to claim 1, the system further comprising a multi-unit filter having at least two units in the input for filtering the liquid before the liquid is received by the evaporative condenser.

19. (Original) A liquid distillation system according to claim 18 wherein the filter is a flip-filter.

20. (Previously Presented) A liquid distillation system according to claim 19, the system further comprising a mechanism for periodically rotating the flip-filter for back-washing filter units to prevent fouling.

Claims 21-23 (Canceled)

24. (Original) A liquid distillation system according to claim 1 further comprising a power source coupled to the system wherein the power source is a clean-burning generator.

25. (Previously Presented) A liquid distillation system comprising:

- a) an input for receiving untreated liquid;
- b) an evaporative condenser coupled to the input for transforming the liquid to vapor and for transforming compressed vapor into a distilled liquid product, wherein the evaporative condenser comprising a plurality of parallel core evaporator tubes, each tube having a first open end in communication with a sump and a second open end in communication with a head chamber;
- c) a head chamber for collecting vapor from the evaporator;
- d) a vapor pump for compressing the vapor, the vapor pump in communication with the evaporative condenser and comprising:
 - 1. an internal drive shaft; and
 - 2. an eccentric motor; and
- e) a multi-unit filter having at least two filter units in the input for filtering liquid before it is received by the evaporator.

26. (Original) A liquid distillation system according to claim 25 further comprising a diverter whereby at least one filter unit is back-washed by a blowdown stream diverted from the head chamber.

27. (Previously Presented) A liquid distillation system comprising:

- a) an input for receiving untreated liquid;

- b) an evaporative condenser coupled to the input for transforming the liquid to vapor and for transforming compressed vapor into a distilled liquid product;
- c) a head chamber for collecting vapor from the evaporator;
- d) a vapor pump for compressing the vapor, the vapor pump in communication with the evaporative condenser and comprising:
 - 1. an internal drive shaft; and
 - 2. an eccentric motor;
- e) a multi-unit filter having at least two filter units in the input for filtering liquid before it is received by the evaporator;
- f) a diverter whereby at least one filter unit is back-washed by a blowdown stream diverted from the head chamber; and
- g) a regulator coupled to the diverter for providing the minimum flow rate blowdown stream from the head chamber necessary to back-wash the at least one filter unit.

28. (Previously Presented) A liquid distillation system comprising:

- a) an input for receiving untreated liquid;
- b) an evaporative condenser coupled to the input for transforming the liquid to vapor and for transforming compressed vapor into a distilled liquid product;
- c) a head chamber for collecting vapor from the evaporator;
- d) a vapor pump for compressing the vapor, the vapor pump in communication with the evaporative condenser and comprising:
 - 1. an internal drive shaft; and
 - 2. an eccentric motor;
- e) a multi-unit flip-filter having at least two filter units in the input for filtering liquid before it is received by the evaporator; and
- f) a diverter whereby at least one filter unit is back-washed by a blowdown stream diverted from the head chamber.

29. (Previously Presented) A liquid distillation system comprising:

- a) an input for receiving untreated liquid;

- b) an evaporative condenser coupled to the input for transforming the liquid to vapor and for transforming compressed vapor into a distilled liquid product;
- c) a head chamber for collecting vapor from the evaporator;
- d) a vapor pump for compressing the vapor, the vapor pump in communication with the evaporative condenser and comprising:
 - 1. an internal drive shaft; and
 - 2. an eccentric motor;
- e) a multi-unit flip- filter having at least two filter units in the input for filtering liquid before it is received by the evaporator ;
- f) a diverter whereby at least one filter unit is back-washed by a blowdown stream diverted from the head chamber; and
- g) a mechanism for periodically rotating the flip-filter at appropriate intervals to prevent fouling.

30. (Previously Presented) A liquid distillation system according to claim 25 further comprising a heat exchanger for receiving input liquid such that heat from at least one of a plurality of sources is added to the input liquid.

31. (Currently Amended) A liquid distillation system comprising:

- a) an input for receiving untreated liquid;
- b) an evaporative condenser coupled to the input for transforming the liquid to vapor and for transforming compressed vapor into a distilled liquid product;
- c) a head chamber for collecting vapor from the evaporator;
- d) a vapor pump for compressing the vapor, the vapor pump in communication with the evaporative condenser and comprising:
 - 1. an internal drive shaft; and
 - 2. an eccentric motor;
- e) a multi-unit filter having at least two filter units in the input for filtering liquid before it is received by the evaporator; and
- f) a heat exchanger for receiving input liquid such that heat from at least one of a plurality of sources is added to the input liquid, wherein the at least one of a plurality of heat

sources is selected from the group consisting of a product stream, a blowdown stream, system waste heat, vapor pump waste heat, motor waste heat, exhaust heat from a power source, and an external heat source.

32. (Previously Presented) A liquid distillation system according to claim 30 wherein the heat exchanger is a multi-line heat exchanger for exchanging heat with the input liquid.

Claims 33 - 35 (Canceled)

36. (Previously Presented) A method for distilling a liquid comprising:

- a. evaporating untreated input liquid in an evaporative condenser to form a vapor to fill a head chamber;
 - b. collecting the vapor from the evaporative condenser in the head chamber;
 - c. compressing the vapor by rotating the vapor in a vapor pump having at least one intake for axial feeding and using a continuous internal drive shaft and eccentric rotor with a fully rotatable housing supported by rotatable housing shaft to produce compressed vapor;
 - d. condensing the compressed vapor in the evaporative condenser having an internal pressure into a distilled liquid product;
 - e. measuring total dissolved solid in a blowdown stream from vaporized untreated liquid;
- and
- f. adjusting a source feed rate of the untreated liquid if the total dissolved solid is above a prescribed level.

Claims 37-48 (Canceled)

49. (Original) A method of distilling a liquid according to claim 36, further comprising coupling a clean-burning generator to the system.

Claims 50-52 (Canceled)

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53. (Original) A method of distilling a liquid according to claim 36, further comprising eliminating entrained liquid droplets from the vapor in the vapor pump.

Claims 54-102 (Canceled)